

**Pharmacognostical Studies on the Chinese Crude Drug
“Xuelianhua (雪蓮花)” and Related Ethno-medicines (Part I)
On Chinese Crude Drug “Xuelianhua” and
Tibetan Crude Drug “Srol-gong” Derived from *Soroseris* (Compositae) Plants**

Seiichi YAMAJI^a, Rui-Ping YANG^a, Katsuko KOMATSU^a,
Tian-Zhi WANG^b and Tsuneo NAMBA^a

^aResearch Institute for Wakan-Yaku, Toyama Medical and Pharmaceutical University,
2630 Sugitani, Toyama, 930-01 JAPAN;

^bSchool of Pharmacy, West China University of Medical Sciences,
Chengdu, 610044 CHINA

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The Chinese crude drug “Xuelianhua”, that is also known as “Bya-rgod sug-pa” in Tibetan Medicine, is used for rheumatoid arthritis, menoxenia, etc. and has been reported to be derived from whole plants of genus *Saussurea* of family Compositae. However, one sample from Songpan market, Sichuan Prov., was found to be derived from *Soroseris* plant possessing ligulate flowers and multiseriata pappi. *Soroseris* plant is reported to be used for fever and rheumatoid arthritis in Tibetan Medicine under the name of “Srol-gong”. We obtained it in Thimphu market, Bhutan. In the present paper, to identify the commercial samples above, a comparative anatomical study was carried out on leaves, stems and underground parts of three species and one subspecies of *Soroseris* growing wild around Tibet. Four taxa could be distinguished from each other by the following characteristics: the number of vascular bundles in midrib, the degree of roughness of anticlinal wall of epidermal cell, and type of hairs in leaf; presence or absence of interfascicular cambium and vascular bundle cap in stem, etc. Based on these results, the botanical origins of “Xuelianhua” from Songpan and “Srol-gong” from Thimphu were determined to be the whole plants in flowering to fruiting of *Soroseris hookeriana* and a mixture of those of *S. gillii* and *S. umbrella*, respectively.

“Xuelianhua (雪蓮花)” is a Chinese crude drug used as the remedies for rheumatoid arthritis, menoxenia, traumatic bleeding, headache, etc. (Chinese Materia Medica 1977, The compilation of Chinese Medicinal Herbs 1975). In the herbological literature, “Xuelianhua” is described to grow in the northwestern part of Ili area (present Kazakhstan and Xinjiang Autonomous Region), Jinchuan (Sichuan Prov.) by Zhao (1765), and in Tibet by Zhu (Bencao

Gangmu Shiyi 1765). The botanical origin of this drug has been reported to be the whole plants or aerial parts of subgenus *Amphilaena* and *Eriocoryne* of genus *Saussurea*, family Compositae (Lian and Xiao 1985, Xie 1994). The plants of these subgenera are also used as ethno-medicines for rheumatoid arthritis and menoxenia by Uygur race under the name of “Tage leylishi” and for anthrax and headache by Tibetan race under the name of “Bya-rgod sug-pa”

(The National Materia Medica of China 1984). Until now, we have obtained "Xuelianhua" and its related ethno-medicines in China, Hongkong, Nepal, and Bhutan. Among them, one "Xuelianhua" in the Songpan market, Sichuan Prov., China, seemed to be derived from *Soroseris* plant of Compositae by its external feature, such as the presence of ligulate flowers and multiseriate pappi. Some *Soroseris* plants, i.e. *S. hookeriana* (C.B. Clark) Stebb. Meyer 1983, The Materia Medica of Tibetan (Qinghai-Xizang) Plateau 1972, *S. hookeriana* ssp. *erysimoides* (Hand.-Mazz.) Stebb. Yang 1991, The National Materia Medica of China 1990, *S. gillii* (S. Moore) Stebb. (Pharmaceutical Standard of Tibetan Materia Medica 1995) are described to be the original plants of Tibetan crude drug "Srol-gong", used for fever, rheumatoid arthritis, food poisoning, trauma, etc. Yuthog 12C. We have obtained the crude drug "Srol-gong" from Thimphu, Bhutan. Seven to eight *Soroseris* species are distributed around Tibet (Stebbins 1940,

Wu et al. 1985), and among them the most widely-spread *S. hookeriana*, *S. hookeriana* ssp. *erysimoides*, *S. gillii*, and *S. umbrella* have been collected in Sichuan Prov. and Tibet, China. In this study, to clarify the botanical origins of "Xuelianhua" from Songpan market and "Srol-gong" from Thimphu market, a comparative anatomical study was carried out on leaves, stems, and underground parts of 3 species and 1 subspecies of *Soroseris* plants.

Materials

Plant specimens for comparison and crude drug samples are shown in Table 1 and 2, respectively. All the materials are preserved in the Museum of Materia Medica, Research Institute for Wakan-Yaku, Toyama Medical and Pharmaceutical University (TMPW).

Results

External morphology Stem is 2–30 cm in height and 6–14 mm in diameter. Cauline or radical leaves are

Table 1. Plant materials for comparison

Locality	Voucher specimen
<i>Soroseris hookeriana</i> (C. B. Clark) Stebb. Songpan County, Sichuan Prov., China	S. H. Wang 860812
<i>S. hookeriana</i> (C. B. Clark) Stebb. subsp. <i>erysimoides</i> (Hand.-Mazz.) Stebb. Kangding County, Sichuan Prov., China	R. P. Yang 8
Qamdo Dist., Tibet Autonomous Region, China	G. C. Zhou et al. C-501
<i>S. gillii</i> (S. Moore) Stebb. Kangding County, Sichuan Prov., China	R. P. Yang 17
<i>S. umbrella</i> (Franch.) Stebb. Jiulong County, Sichuan Prov., China	G. H. Tang 51

Plant specimens are preserved in the Museum of Materia Medica, Research Institute for Wakan-Yaku, Toyama Medical and Pharmaceutical University or Chengdu University of Traditional Chinese Medicine.

Table 2. Crude drug samples and their botanical origins according to our result

Name	Locality	Date of purchase (TMPW No.)	Botanical origin
Xuelianhua	Songpan County Pharmaceutical Co., Sichuan Prov., China	Jun., 1987 (No. 7550)	<i>S. hookeriana</i>
Srol-gong	Thimphu, Bhutan	Apr., 1994 (No. 14985)	<i>S. gillii</i> & <i>S. umbrella</i> (1:2)

Crude drug samples are preserved in the Museum of Materia Medica, Research Institute for Wakan-Yaku, Toyama Medical and Pharmaceutical University.

linear, lanceolate, oblanceolate, or ovate in shape. Capitula are crowded on the dilated top of a simple stem, shortly peduncled, and globose. Involucral bracts are biseriate, and the outer one is filiform, 2 in number and the inner one is linear, or narrow-lanceolate to lanceolate, 4 or 10–15 in number. Corollas are ligulate and yellow. Pappus-hairs are multiseriate and bristles. The underground part consists of rhizome and root, of which external distinction is difficult. The morphological characteristics of each species are summarized in Table 3.

General anatomical characteristics Histological observation was made on the transections and surface views at the middle part of leaf blades, and on the transections of stems and underground parts cut at 1 cm away from the base, respectively. The degree of roughness of both adaxial and abaxial epidermal cells of leaf was measured by means of Image Analyzer (Yamaji et al. 1993), and its value is expressed in $SFC (Roughness) = (Perimeter)^2 / (4\pi \times Area)$.

Leaf (Fig. 1): Midrib is slightly concave or convex on adaxial side and convex on abaxial side in shape. Palisade parenchyma cells are 2–5 layers, observed in adaxial side only. Vascular bundle is collateral, and in midrib it is 1(2) or 3–5 in number. Laticifers are scattered in the peripheral part of the phloem. In surface view except on vein, the anticlinal walls of epidermal cells are nearly straight or wavy, and the degree of roughness on both adaxial and abaxial sides vary in each species. Hairs are nonglandular, uniseriate or biseriate, and unicellular or multicellular.

Stem (Fig. 2): Transection is orbicular in shape. Vascular bundles are collateral and in some species cambium ring is observed. Laticifers are anastomosing articulated, and some are scattered in the peripheral part of the phloem and others in the phloem alone or in groups. Tracheary elements consist of vessels with scalariform, reticulate, and spiral thickening. Vascular bundle caps composed of thick-walled parenchyma cells are observed in some species, only on

Table 3. External Morphologies of *Soroseris* spp.

		<i>S. hookeriana</i>	<i>S. hookeriana</i> ssp. <i>erysimoides</i>	<i>S. gillii</i>	<i>S. umbrella</i>
LEAF					
Leaf Blade	outline	lanceolate to oblanceolate	linear to oblanceolate	lanceolate	lanceolate-oblong to ovate
	margin	entire or undulate	entire or undulate	pinnatifid	undulate
	length (mm)	13.5–24	15–40	70–120	25–50
Hair	width (mm)	7.5–11	3–8	10–24	8–50
	adaxial side	++++	+(–)	++	++
		abaxial side	++++	++	++
INVOLUCRAL BRACT					
Outer	number	2	2	2	4
	outline	filiform	filiform	filiform	filiform
Inner	number	4	4	4	10–15
	outline	broad-linear to narrow lanceolate	linear to broad-linear	linear to broad-linear	narrow lanceolate to lanceolate
FLOWER					
Number per capitulum		4	4	4	15–40
Length of corolla (mm)		16	12	16	14
PAPPUS					
Color		grey-yellow	grey-green	pale-brown	white
Length (mm)		11–13	6–7	11–13	9–11

Table 4. Anatomical Characteristics of *Soro-seris* spp.

	<i>S. hookeriana</i>	<i>S. hookeriana</i> ssp. <i>erysimoides</i>	<i>S. gillii</i>	<i>S. umbrellae</i>
LEAF				
MIDRIB				
Thickness (μm)	600–780–880	350–400–500	820–1650–1730	1170–1550–1800
Outline	adaxial side abaxial side	adaxial side abaxial side	adaxial side abaxial side	adaxial side abaxial side
Number of vascular bundles	1	1	3–3–5	1–1–2
Palisade tissue on adaxial side	+	–	–	–
LAMINA				
Thickness (μm)	570–740–830	170–220–340	390–450–570	520–710–1110
Palisade tissue	number of cell layers	2–3–4	2–2–3	2–3–5
	diameter of cells of outermost layer in major axis (μm)	55–100–170	45–65–75	50–95–110
	roughness of the anticlinal wall of epidermal cells**	1.67 $\pm$ 0.20	1.75 $\pm$ 0.26	2.05 $\pm$ 0.47
	area of epidermal cells (μm^2)	1660 $\pm$ 460	1550 $\pm$ 330	2850 $\pm$ 920
	stomatal index	14.1–18.5	16.3–22.5	18.5–22.8
Epd*	number of seriation	2	2	1
	length (μm)	1540–2680–4710	200–440–1220	50–750–1120
	width (μm)	37–50–60	25–30–50	25–45–55
	thickness of wall (μm)	2–2–3	2–2–3	2–3–8
	roughness of the anticlinal wall of epidermal cells	2.37 $\pm$ 0.49	2.07 $\pm$ 0.38	1.73 $\pm$ 0.26
	area of epidermal cells (μm^2)	1440 $\pm$ 320	1760 $\pm$ 500	3160 $\pm$ 1030
	stomatal index	16.2–22.4	21.3–26.4	21.4–26.9
Epb*	number of seriation	2	2	1
	length (μm)	1730–3640–8420	70–360–1430	120–700–1360
	width (μm)	47–55–68	25–35–50	25–35–50
	thickness of wall (μm)	2–2–3	2–2–3	2–8–10
STEM				
Epidermal cell	tangential diameter (μm)	12–24–38	15–30–50	12–20–35
	radial diameter (μm)	12–21–34	15–20–35	12–20–25
Cortex	number of cell layers	12–15–18	6–11–15	8–13–17
	max. diameter of cells (μm)	37–53–88	25–60–90	20–40–80
Number of vascular bundles		60–67–69	52–55–58	81–82–86
Vascular bundle cap on xylem		–	+	–
Interfascicular cambium		+	–	+
Max. diameter of vessel (μm)		35–47–54	19–29–34	45–48–55
UNDERGROUND PART				
Cork tissue	number of cell layers	5–7–8	3–4–6	4–5–6
	tangential diameter of cells of outermost layer (μm)	17–54–93	13–41–91	21–32–72
Thick-walled cells in interfascicular region		–	+, –	+
Max. diameter of vessel (μm)		47–54–72	38–48–66	58–62–68

Observed parts were at the middle part of leaf blade, and 1 cm away from the base of stem and underground part, respectively. Each value is indicated in min., mode and max., min. and max., or mean $\pm$ SD. +, present; –, absent.

*On surface view: Epd, adaxial epidermis; Epb, abaxial epidermis.

**Roughness is expressed in the SFC Value [SFC = Perimeter²/(4 π × area)].

the xylem side. Pith is parenchymatous and hollow.

Underground part (Fig. 3): At 1 cm away from the base, the structure of some species is of rhizome (B_1 , C_1) and that of the other is of transitional part from rhizome to root (D_1 , D_1' , E_1). Common structures to all

species examined are as follows: the outermost layer consists of periderm; laticifers are scattered throughout secondary phloem; tracheary elements are vessel members with scalariform, reticulate or spiral thickening; cambium ring is observed; pith composed of

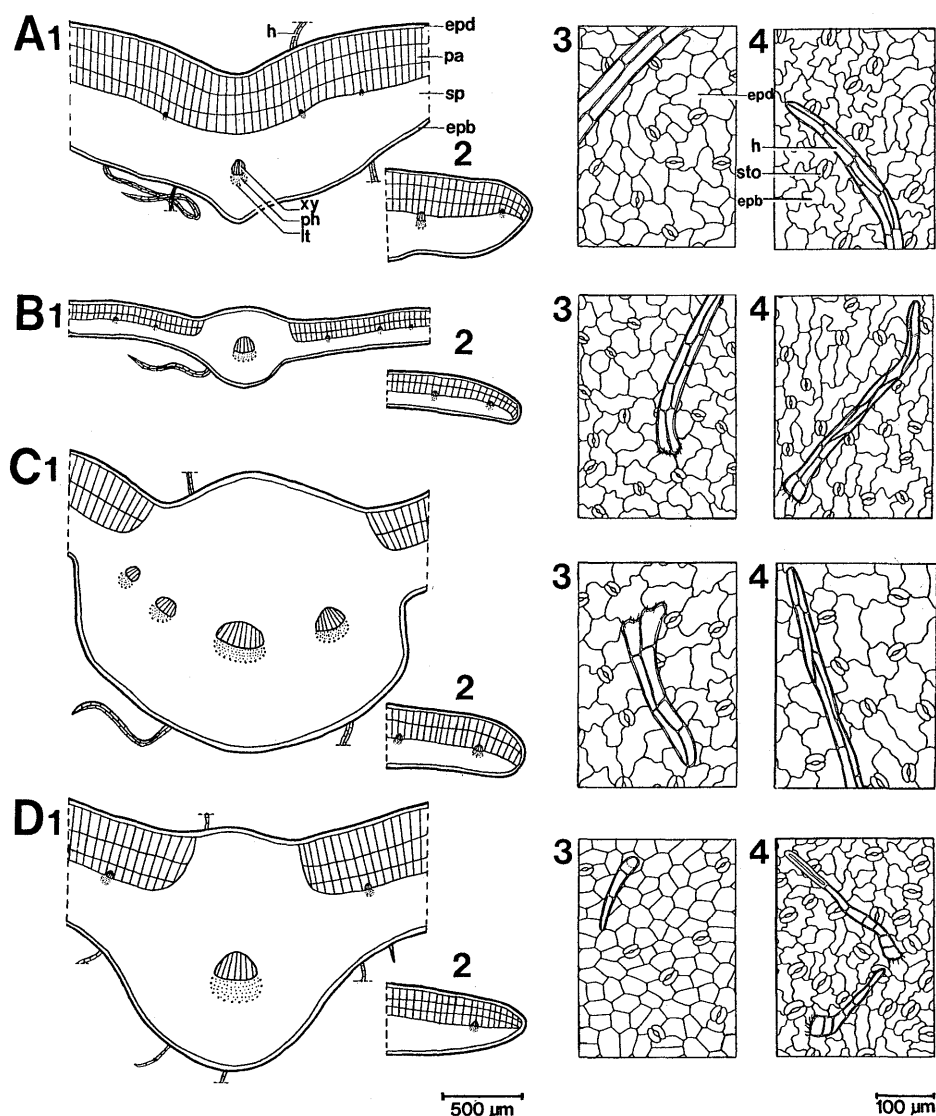


Fig. 1. Transections of midrib (1) and margin (2), and surface views of adaxial (3) and abaxial (4) sides of leaf. A, *Soroseris hookeriana*; B, *S. hookeriana* ssp. *erysimoides*; C, *S. gillii*; D, *S. umbrella*. (epb, abaxial epidermis; epd, adaxial epidermis; h, hair; lt, laticifer; pa, palisade parenchyma; ph, phloem; sp, spongy parenchyma; sto, stoma; xy, xylem)

parenchyma cells is present and hollow; parenchyma cells contain inulin. In some species, thick-walled parenchyma cells are observed in interfascicular region.

Anatomical characteristics of plant materials

1. *Soroseris hookeriana*

Leaf (Fig. 1-A): Midrib is slightly concave on

adaxial side. The thickness is 600–880 μm in midrib and 570–830 μm in laminar region. In the midrib, vascular bundle is 1 in number and palisade parenchyma is observed on adaxial side. In surface views, the anticlinal wall of adaxial epidermal cell is wavy and the degree of roughness is computed to be 1.67 ± 0.20 (mean $\pm$ S.D.). Hairs are biserial, multicel-

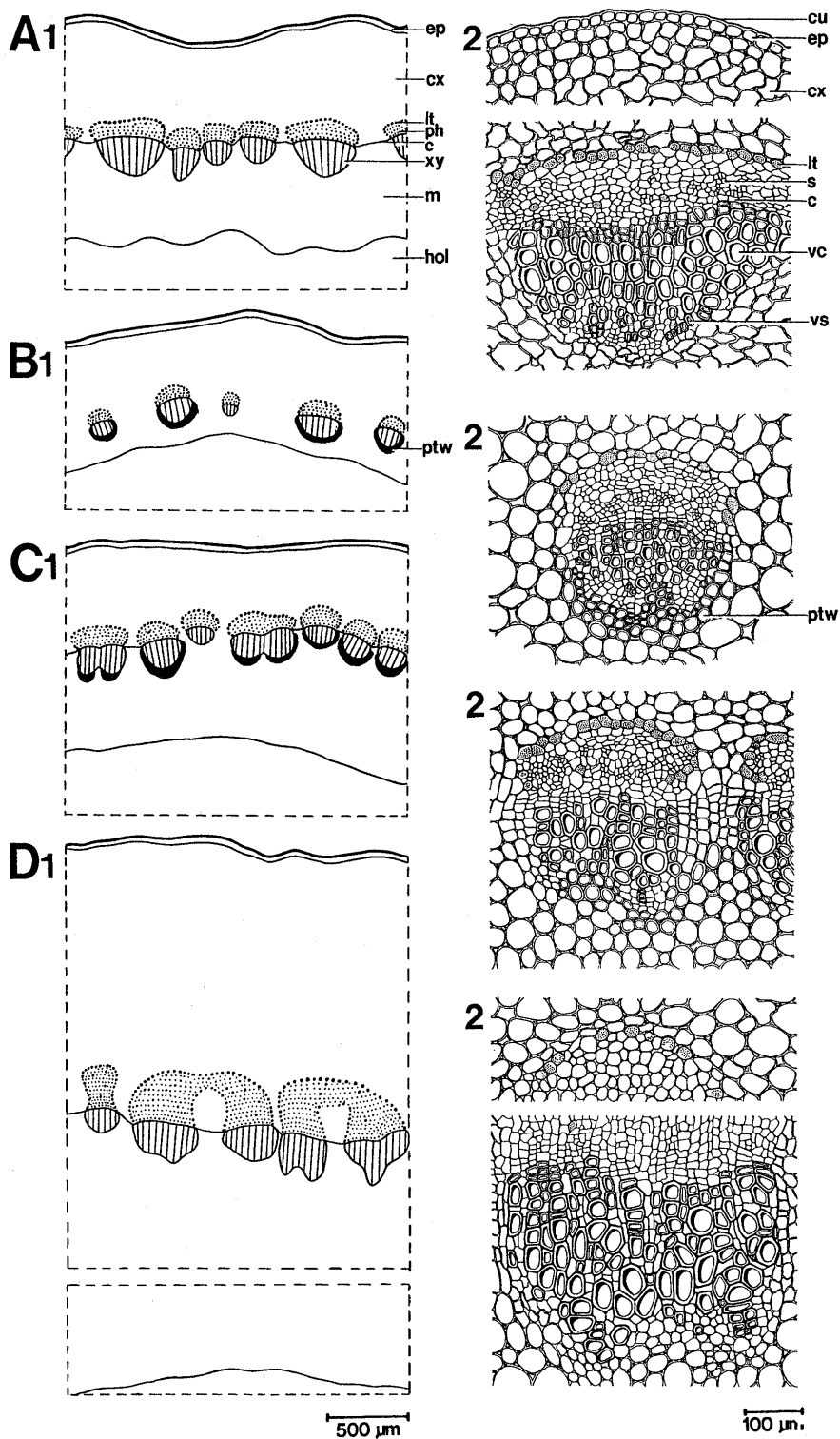


Fig. 2. Diagrams (1) and detailed drawings (2) of transections of stem. A, *Soroseris hookeriana*; B, *S. hookeriana* ssp. *erysimoides*; C, *S. gillii*; D, *S. umbrella*. (c, cambium; cu, cuticle; cx, cortex; ep, epidermis; hol, hollow; lt, laticifer; m, pith; ph, phloem; ptw, thick-walled parenchyma; s, sieve tube; vc, scalariform vessel; vs, spiral vessel; xy, xylem)

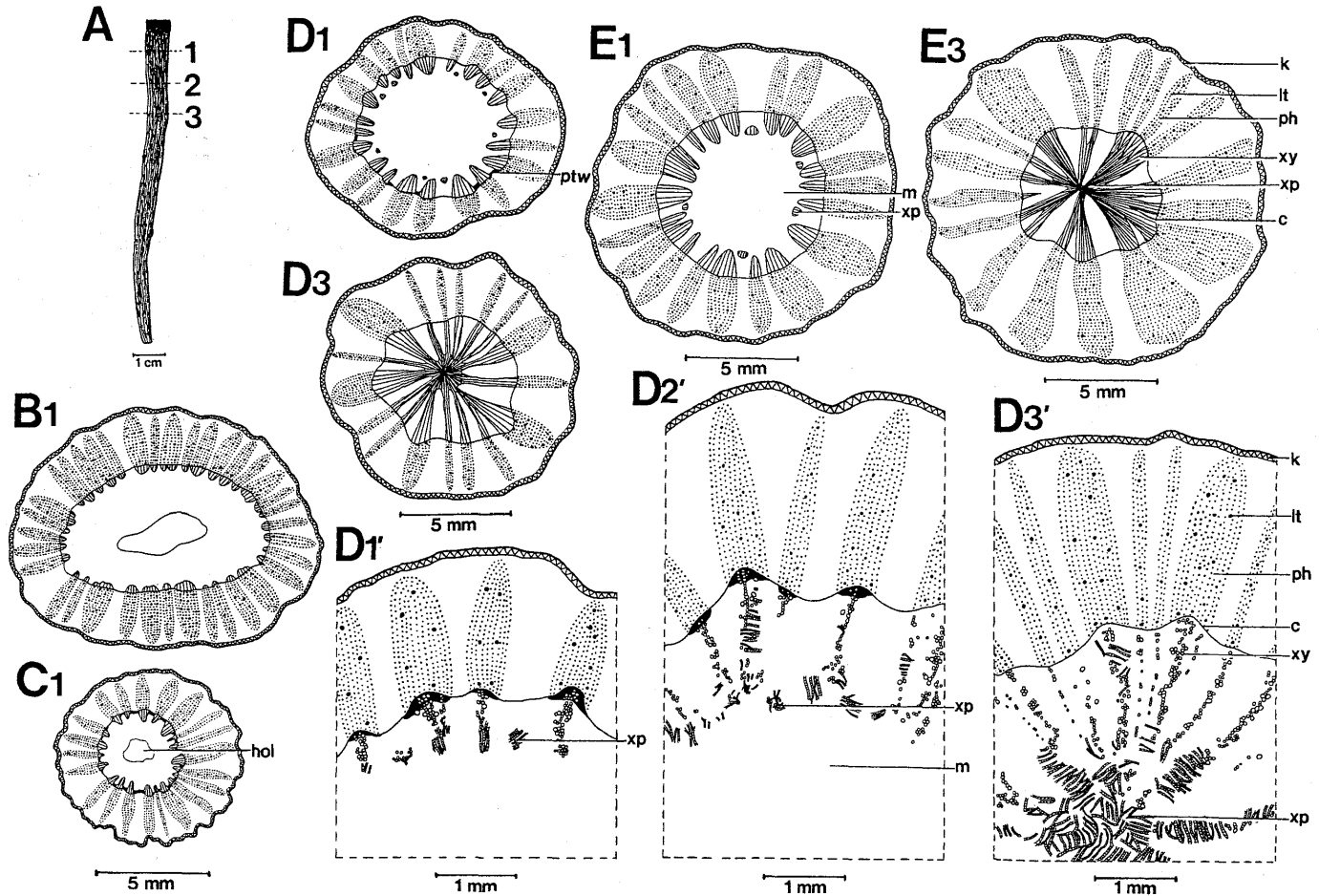


Fig. 3. Sketch (A) and diagrams (B–E) of transections of underground part. B: *Soroiseris hookeriana*, C: *S. hookeriana* ssp. *erysimoides*, A, D: *S. gillii*, E: *S. umbrellae*. 1 & 1', 2, 3 & 3': transections at level 1 cm, 2 cm and 3 cm from the base indicated as "1", "2" and "3" in A, respectively. B₁, C₁: rhizome, D₁, E₁: transitional part from rhizome to root, D₃, E₃: root. D₁~D₃: detailed diagrams from transitional part D₁ to root D₃. (c, cambium; hol, hollow; k, cork; lt, laticifer; m, pith; ph, phloem; ptw, thick-walled parenchyma; xp, protoxylem; xy, xylem).

lular, and the longest among the 4 taxa, measuring above 1.5 mm in length.

Stem (Fig. 2-A): Interfascicular cambium is observed except at leaf gaps. Vessels are 35–54 μm in maximum diameter.

Underground part (Fig. 3-B₁): At 1 cm away from the base, the structure is of rhizome, and at 7 cm away, the transition to root is observed.

2. *S. hookeriana* ssp. *erysimoides*

Leaf (Fig. 1-B): Midrib is almost plain on adaxial side. The thickness is 350–500 μm in midrib and 170–340 μm in laminar region. Vascular bundle in midrib is 1. Hairs are biseriate, multicellular, and below 1.5 mm in length.

Stem (Fig. 2-B): Vascular bundle cap is present and interfascicular cambium is absent.

Underground part (Fig. 3-C₁): The structure varies in different samples, because the level and range of transitional part from rhizome to root are changeable in the same taxon. For example, in the specimen of Yang 8, the structure is observed to be a complete rhizome, whereas in that of Zhou et al. C-501, to be a transitional part. Thick-walled parenchyma cells may be observed in interfascicular regions.

3. *S. gillii*

Leaf (Fig. 1-C): Midrib is slightly convex on adaxial side. Vascular bundles in midrib are 3–5. In surface views, the anticlinal wall of adaxial epidermal cell is obviously wavy and the degree of roughness is computed to be 2.05 ± 0.47 , the highest in the four taxa. Hairs are biseriate and multicellular.

Stem (Fig. 2-C): Both interfascicular cambium and vascular bundle cap are observed.

Underground part (Figs. 3-A, D): At 1 cm away from the base, the transitional structures from rhizome to root are observed (D₁, D₁'), and at 3 cm or more away, the structure of root without pith becomes stable (D₃, D₃'). As the level is lower, its diameter smaller. Thick-walled parenchyma cells are observed in interfascicular regions at the level 1 cm away.

4. *S. umbrella*

Leaf (Fig. 1-D): Midrib is almost plain on adaxial side. The blade is thicker than that of any other taxa, measuring 1170–1800 μm in midrib and 520–1110 μm in laminar region. Vascular bundles in midrib are 1–2. In surface view, the anticlinal wall of adaxial epidermal cell is nearly straight and the degree of roughness is computed to be 1.40 ± 0.20 , the lowest in the 4 taxa. The stomatal index (Trease and Evans 1966) on adaxial side is the lowest, 9.2–13.9. Hairs are uniseriate, and unicellular or multicellular. The wall of one or more apical cells of some hairs is thick (Fig. 1-D₄).

Stem (Fig. 2-D): Interfascicular cambium is observed.

Underground part (Figs. 3-E₁, E₃): The structure is similar to that of *S. gillii*, but thick-walled parenchyma in interfascicular region is absent.

External features and botanical origins of "Xuelianhua" and "Srol-gong"

1. "Xuelianhua" (Fig. 4-A): The sample consists of whole plants during flowering to fruiting. Capitula are crowded on the dilated top of a simple stem, peduncled, and globose. All the corollas are ligulate. Pappi are multiseriate, bristles, and pale-yellow in color. Leaves covered with hairs are lanceolate, nearly entire in shape and pale-green to pale-brown in color. Stem is hollow and 7–14 mm in diameter. Underground part is long cylindrical in shape and yellow-brown to pale-brown in color. The sample has slightly bitter taste and no specific odor.

The anatomical characteristics of the sample well agreed with those of *S. hookeriana*.

2. "Srol-gong" (Fig. 4-B): The sample consists of broken whole plants containing inflorescence, leaves, stems, and underground parts. It was collected in the season of flowering to fruiting. Capitula have two different kinds of inner involucre bracts in shape and number. One is linear in shape and 4 in number, and the other is narrow-lanceolate to lanceolate in shape

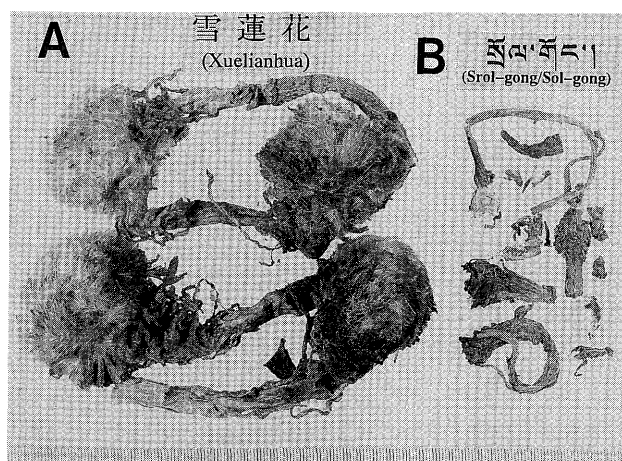


Fig. 4. Chinese crude drug “Xuelianhua” from Songpan market (A) and Tibetan crude drug “Srol-gong” from Thimphu market (B). The sample A is derived from *Soroseris hookeriana* (TMPW No. 7550) and B, a mixture of *S. gillii* and *S. umbrella* (No. 14985). “Xuelianhua” is expressed in Chinese and “Srol-gong” in Tibetan characters.

and 10–12 in number. Pappi are multiseriate, bristles, and white in color. Leaves are ovate, undulate and dark-green. Stems are hollow and 7–8 mm in diameter. The underground parts with several lateral roots are cylindrical in shape and pale-yellow in color.

Anatomically, the sample is shown to be a mixture of whole plants of *S. gillii* and those of *S. umbrella* in ratio of 1:2.

Discussion

1. The leaf, stem, and underground parts of four taxa of *Soroseris* plants examined could be anatomically distinguished from each other by the characteristics such as the number of vascular bundles in the midrib, the presence of palisade tissue on adaxial side of midrib, the degree of roughness of anticlinal wall of epidermal cell, the number of seriation of hairs in leaf, and the presence of interfascicular cambium and of vascular bundle cap on the xylem side in stem (Table 3).
2. Commercial sample of “Xuelianhua” obtained at Songpan market, China, was determined to be derived

from the whole plants of *S. hookeriana* and that of “Srol-gong” obtained at Thimphu market, Bhutan, was from a mixture of whole plants of *S. gillii* and those of *S. umbrella* in ratio of 1:2.

3. According to the description of herbal literature “Bencao Gangmu Shiyi (1765)”, “Xuelianhua” produced in Ili area has thin sepal and that in Tibet has dark red flower and looks like a cockscomb. The botanical origin of “Xuelianhua” is thought to be *Saussurea* plants properly. Nevertheless, *S. hookeriana* was found as “Xuelianhua” at Songpan market, Sichuan Prov. This species bears achenes with pappi in fructification, which looks like a cockscomb, and grows in alpine region near snowline as some of *Saussurea* plants. Moreover, the whole plant of *S. hookeriana* is used for the same treatment as “Xuelianhua”, i.e. fever, rheumatoid arthritis, trauma in Tibetan Medicine (Deumar 1727) and fever, traumatic bleeding as a folk medicine in Yunnan Prov. (Index of Natural Resources of Chinese Medicines in Yunnan Prov. 1993). The similarities in morphology, habitat and usage mentioned above may cause a

misunderstanding. Xie (1994) has also reported that one *Soroseris* plant called “Maolianhua (毛蓮花)” or “Maoxuelian (毛雪蓮)” in Ruergai, Sichuan Prov., whose species is unclear, is confused with “Xuelianhua” due to the similarity in name, but this drug is used for the treatment of hepatic problems and hypertension. Therefore, it requires more studies on medicinal efficacy to determine whether *S. hookeriana* can be used as “Xuelianhua” or not.

4. In this study, *Soroseris umbrella* was found to be one of the botanical origins of “Srol-gong”. The roots of *S. umbrella* are reported to be used for tonifying digestion, Qi- and yin-tonic and production of body fluid in Yunnan Prov. as a folk medicine “Tiaoshen (条参)” (Index of Natural Resources of Chinese Medicines in Yunnan Prov. 1993). Since the commercial sample from Bhutan contained the roots of this species, the efficacy of this sample is doubtful.

5. In the literature of Tibetan Medicine “Vaidurya sngon-po (Gyatso 1687)”, the following descriptions are seen: Leaf of the “Srol-gong” is similar to the saw blade, pinnate in shape, looks like that of *Khur-mang* (a kind of *Taraxacum* spp.), and latex oozes when snapped off. “Srol-gong” is graded into yellow and white. On its illustration (Meyer 1992), the yellow grade “Srol-gong (= Srol-gong ser-po)” has yellow flowers and non-pinnate leaves whereas the white

grade “Srol-gong (= Srol-gong dkar-po)” has white flowers and pinnate leaves (Fig. 5). Thus, the yellow one does not agree with the description. However, there is a note on the literature, “The treatise, at least, does not indicate the favored regions for the growth of specific herbs. Among those mentioned most frequently are Yerpa, north of Lhasa” (Meyer 1992). According to it, “Srol-gong ser-po from Yerpa” in the illustrations (Fig. 5-B) may not be an ideal “Srol-gong”. *Soroseris* plants which have both pinnate leaves and yellow flowers are such as *S. gillii* and *S. pumila*. Among them, *S. gillii* was found out in the commercial sample from Bhutan. On the other hand, with regard to white grade “Srol-gong (= Srol-gong dkar-po)”, only one species, *S. glomerata* (Decne.) Stebb. agrees with the above description because it has mainly white flowers.

6. According to our investigation around the Himalayan region in Nepal, the whole plant of *S. hookeriana*, called “Ja chu serpo”, was used for fever by Lama Amchi, Sonam Namgyal, a doctor of traditional Tibetan medicine (Namba et al. 1988). Moreover, there are many descriptions about medicinal use of them in Tibetan Medicine (The useful Materia Medica of Tibet 1973, Manual of Tibetan Materia Medica 1991) including Mongolian Medicine (Jampal rdo-rje 19C). *Soroseris* plants grow mainly around Himalayan and

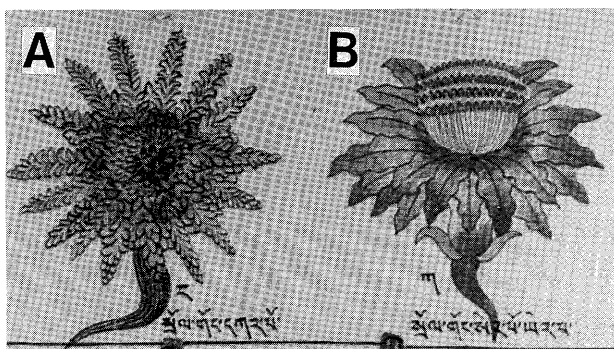


Fig. 5. Illustration of ‘Srol-gong dkar-po (A)’ and ‘Srol-gong ser-po produced in Yerpa (B)’ from the ‘Than-ga’ of “Vaidurya sngon-po (17C, Revised by Meyer 1992).”

adjacent regions, where the use of *Soroseris* plants is limited, and therefore, it is indigenous for Tibetan Medicine.

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山路誠一, 楊 瑞萍, 小松かつ子, 王 天志, 難波恒雄: 「雪蓮花」類藥物の生薬学的研究 (第1報). *Soroseris* 属植物 (キク科) に由来する漢薬「雪蓮花」及びチベット薬物「Srol-gong」について
漢薬「雪蓮花」は, チベット医学では「Bya-rgod sug-pa」としても知られ, 清熱解毒, 調經止

血などの目的で用いられている。本薬物はキク科トウヒレン属植物の全草に由来すると報告されているが, 中国の四川省松潘市場品は舌状の花冠, 多層の冠毛を有することから *Soroseris* 属植物に

由来するものであった。*Soroseris* 属植物はチベット薬物「Srol-gong」の原植物とされ、清熱解毒、外傷治療に用いられている。本報では松潘市場品「雪蓮花」及びティンブー市場品「Srol-gong」の原植物を明らかにする目的でチベット周辺に最も広く分布する *Soroseris* 属植物 3 種 1 亜種について比較組織学的に検討した。4 タクサは葉の主脈部の維管束の数、表皮細胞の垂側壁の波状の程度及び毛の状態、茎における維管束間形成層及び

vascular bundle cap の有無などによって区別可能であった。以上の結果に基づいて市場品の基源を検討したところ、松潘市場品「雪蓮花」は *Soroseris hookeriana*, ティンブー市場品「Srol-gong」は *S. gillii* と *S. umbrella* の混合品で、いずれも花期～結実期の全草であった。

(^a 富山医科薬科大学和漢薬研究所,

^b 中国・華西医科大学薬学院)